

10/590441
IAP9 Rec'd PCT/PTO 23 AUG 2006

Sequencing List
SEQUENCE LISTING

<110> JAPAN SCIENCE AND TECHNOLOGY AGENCY

<120> Highly efficient gene targeting

<130> RJ007P41

<160> 30

<170> PatentIn version 3.1

<210> 1

<211> 609

<212> PRT

<213> Homo sapiens

<400> 1

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Glu Glu Glu Gln Glu Glu Asn Leu Glu Ala Ser Gly Asp Tyr Lys Tyr
20 25 30

Ser Gly Arg Asp Ser Leu Ile Phe Leu Val Asp Ala Ser Lys Ala Met
35 40 45

Phe Glu Ser Gln Ser Glu Asp Glu Leu Thr Pro Phe Asp Met Ser Ile
50 55 60

Gln Cys Ile Gln Ser Val Tyr Ile Ser Lys Ile Ile Ser Ser Asp Arg
65 70 75 80

Asp Leu Leu Ala Val Val Phe Tyr Gly Thr Glu Lys Asp Lys Asn Ser
85 90 95

Val Asn Phe Lys Asn Ile Tyr Val Leu Gln Glu Leu Asp Asn Pro Gly
100 105 110

Ala Lys Arg Ile Leu Glu Leu Asp Gln Phe Lys Gly Gln Gln Gly Gln
115 120 125

Lys Arg Phe Gln Asp Met Met Gly His Gly Ser Asp Tyr Ser Leu Ser
130 135 140

Glu Val Leu Trp Val Cys Ala Asn Leu Phe Ser Asp Val Gln Phe Lys
145 150 155 160

Met Ser His Lys Arg Ile Met Leu Phe Thr Asn Glu Asp Asn Pro His
165 170 175

Sequencing list

Gly Asn Asp Ser Ala Lys Ala Ser Arg Ala Arg Thr Lys Ala Gly Asp
180 185 190

Leu Arg Asp Thr Gly Ile Phe Leu Asp Leu Met His Leu Lys Lys Pro
195 200 205

Gly Gly Phe Asp Ile Ser Leu Phe Tyr Arg Asp Ile Ile Ser Ile Ala
210 215 220

Glu Asp Glu Asp Leu Arg Val His Phe Glu Glu Ser Ser Lys Leu Glu
225 230 235 240

Asp Leu Leu Arg Lys Val Arg Ala Lys Glu Thr Arg Lys Arg Ala Leu
245 250 255

Ser Arg Leu Lys Leu Lys Leu Asn Lys Asp Ile Val Ile Ser Val Gly
260 265 270

Ile Tyr Asn Leu Val Gln Lys Ala Leu Lys Pro Pro Pro Ile Lys Leu
275 280 285

Tyr Arg Glu Thr Asn Glu Pro Val Lys Thr Lys Thr Arg Thr Phe Asn
290 295 300

Thr Ser Thr Gly Gly Leu Leu Leu Pro Ser Asp Thr Lys Arg Ser Gln
305 310 315 320

Ile Tyr Gly Ser Arg Gln Ile Ile Leu Glu Lys Glu Glu Thr Glu Glu
325 330 335

Leu Lys Arg Phe Asp Asp Pro Gly Leu Met Leu Met Gly Phe Lys Pro
340 345 350

Leu Val Leu Leu Lys Lys His His Tyr Leu Arg Pro Ser Leu Phe Val
355 360 365

Tyr Pro Glu Glu Ser Leu Val Ile Gly Ser Ser Thr Leu Phe Ser Ala
370 375 380

Leu Leu Ile Lys Cys Leu Glu Lys Glu Val Ala Ala Leu Cys Arg Tyr
385 390 395 400

Thr Pro Arg Arg Asn Ile Pro Pro Tyr Phe Val Ala Leu Val Pro Gln
405 410 415

Glu Glu Glu Leu Asp Asp Gln Lys Ile Gln Val Thr Pro Pro Gly Phe

Sequencing list

420 425 430
 Gln Leu Val Phe Leu Pro Phe Ala Asp Asp Lys Arg Lys Met Pro Phe
 435 440 445

Thr Glu Lys Ile Met Ala Thr Pro Glu Gln Val Gly Lys Met Lys Ala
 450 455 460

Ile Val Glu Lys Leu Arg Phe Thr Tyr Arg Ser Asp Ser Phe Glu Asn
 465 470 475 480

Pro Val Leu Gln Gln His Phe Arg Asn Leu Glu Ala Leu Ala Leu Asp
 485 490 495

Leu Met Glu Pro Glu Gln Ala Val Asp Leu Thr Leu Pro Lys Val Glu
 500 505 510

Ala Met Asn Lys Arg Leu Gly Ser Leu Val Asp Glu Phe Lys Glu Leu
 515 520 525

Val Tyr Pro Pro Asp Tyr Asn Pro Glu Gly Lys Val Thr Lys Arg Lys
 530 535 540

His Asp Asn Glu Gly Ser Gly Ser Lys Arg Pro Lys Val Glu Tyr Ser
 545 550 555 560

Glu Glu Glu Leu Lys Thr His Ile Ser Lys Gly Thr Leu Gly Lys Phe
 565 570 575

Thr Val Pro Met Leu Lys Glu Ala Cys Arg Ala Tyr Gly Leu Lys Ser
 580 585 590

Gly Leu Lys Lys Gln Glu Leu Leu Glu Ala Leu Thr Lys His Phe Gln
 595 600 605

Asp

<210> 2
 <211> 732
 <212> PRT
 <213> Homo sapiens

<400> 2

Met Val Arg Ser Gly Asn Lys Ala Ala Val Val Leu Cys Met Asp Val
 1 5 10 15

Sequencing list

Gly Phe Thr Met Ser Asn Ser Ile Pro Gly Ile Glu Ser Pro Phe Glu
20 25 30

Gln Ala Lys Lys Val Ile Thr Met Phe Val Gln Arg Gln Val Phe Ala
35 40 45

Glu Asn Lys Asp Glu Ile Ala Leu Val Leu Phe Gly Thr Asp Gly Thr
50 55 60

Asp Asn Pro Leu Ser Gly Gly Asp Gln Tyr Gln Asn Ile Thr Val His
65 70 75 80

Arg His Leu Met Leu Pro Asp Phe Asp Leu Leu Glu Asp Ile Glu Ser
85 90 95

Lys Ile Gln Pro Gly Ser Gln Gln Ala Asp Phe Leu Asp Ala Leu Ile
100 105 110

Val Ser Met Asp Val Ile Gln His Glu Thr Ile Gly Lys Lys Phe Glu
115 120 125

Lys Arg His Ile Glu Ile Phe Thr Asp Leu Ser Ser Arg Phe Ser Lys
130 135 140

Ser Gln Leu Asp Ile Ile His Ser Leu Lys Lys Cys Asp Ile Ser
145 150 155 160

Leu Gln Phe Phe Leu Pro Phe Ser Leu Gly Lys Glu Asp Gly Ser Gly
165 170 175

Asp Arg Gly Asp Gly Pro Phe Arg Leu Gly Gly His Gly Pro Ser Phe
180 185 190

Pro Leu Lys Gly Ile Thr Glu Gln Gln Lys Glu Gly Leu Glu Ile Val
195 200 205

Lys Met Val Met Ile Ser Leu Glu Gly Glu Asp Gly Leu Asp Glu Ile
210 215 220

Tyr Ser Phe Ser Glu Ser Leu Arg Lys Leu Cys Val Phe Lys Lys Ile
225 230 235 240

Glu Arg His Ser Ile His Trp Pro Cys Arg Leu Thr Ile Gly Ser Asn
245 250 255

Leu Ser Ile Arg Ile Ala Ala Tyr Lys Ser Ile Leu Gln Glu Arg Val
260 265 270

Sequencing list

Lys Lys Thr Trp Thr Val Val Asp Ala Lys Thr Leu Lys Lys Glu Asp
275 280 285

Ile Gln Lys Glu Thr Val Tyr Cys Leu Asn Asp Asp Asp Glu Thr Glu
290 295 300

Val Leu Lys Glu Asp Ile Ile Gln Gly Phe Arg Tyr Gly Ser Asp Ile
305 310 315 320

Val Pro Phe Ser Lys Val Asp Glu Glu Gln Met Lys Tyr Lys Ser Glu
325 330 335

Gly Lys Cys Phe Ser Val Leu Gly Phe Cys Lys Ser Ser Gln Val Gln
340 345 350

Arg Arg Phe Phe Met Gly Asn Gln Val Leu Lys Val Phe Ala Ala Arg
355 360 365

Asp Asp Glu Ala Ala Ala Val Ala Leu Ser Ser Leu Ile His Ala Leu
370 375 380

Asp Asp Leu Asp Met Val Ala Ile Val Arg Tyr Ala Tyr Asp Lys Arg
385 390 395 400

Ala Asn Pro Gln Val Gly Val Ala Phe Pro His Ile Lys His Asn Tyr
405 410 415

Glu Cys Leu Val Tyr Val Gln Leu Pro Phe Met Glu Asp Leu Arg Gln
420 425 430

Tyr Met Phe Ser Ser Leu Lys Asn Ser Lys Lys Tyr Ala Pro Thr Glu
435 440 445

Ala Gln Leu Asn Ala Val Asp Ala Leu Ile Asp Ser Met Ser Leu Ala
450 455 460

Lys Lys Asp Glu Lys Thr Asp Thr Leu Glu Asp Leu Phe Pro Thr Thr
465 470 475 480

Lys Ile Pro Asn Pro Arg Phe Gln Arg Leu Phe Gln Cys Leu Leu His
485 490 495

Arg Ala Leu His Pro Arg Glu Pro Leu Pro Pro Ile Gln Gln His Ile
500 505 510

Sequencing list

Trp Asn Met Leu Asn Pro Pro Ala Glu Val Thr Thr Lys Ser Gln Ile
515 520 525

Pro Leu Ser Lys Ile Lys Thr Leu Phe Pro Leu Ile Glu Ala Lys Lys
530 535 540

Lys Asp Gln Val Thr Ala Gln Glu Ile Phe Gln Asp Asn His Glu Asp
545 550 555 560

Gly Pro Thr Ala Lys Lys Leu Lys Thr Glu Gln Gly Gly Ala His Phe
565 570 575

Ser Val Ser Ser Leu Ala Glu Gly Ser Val Thr Ser Val Gly Ser Val
580 585 590

Asn Pro Ala Glu Asn Phe Arg Val Leu Val Lys Gln Lys Lys Ala Ser
595 600 605

Phe Glu Glu Ala Ser Asn Gln Leu Ile Asn His Ile Glu Gln Phe Leu
610 615 620

Asp Thr Asn Glu Thr Pro Tyr Phe Met Lys Ser Ile Asp Cys Ile Arg
625 630 635 640

Ala Phe Arg Glu Glu Ala Ile Lys Phe Ser Glu Glu Gln Arg Phe Asn
645 650 655

Asn Phe Leu Lys Ala Leu Gln Glu Lys Val Glu Ile Lys Gln Leu Asn
660 665 670

His Phe Trp Glu Ile Val Val Gln Asp Gly Ile Thr Leu Ile Thr Lys
675 680 685

Glu Glu Ala Ser Gly Ser Ser Val Thr Ala Glu Glu Ala Lys Lys Phe
690 695 700

Leu Ala Pro Lys Asp Lys Pro Ser Gly Asp Thr Ala Ala Val Phe Glu
705 710 715 720

Glu Gly Gly Asp Val Asp Asp Leu Leu Asp Met Ile
725 730

<210> 3

<211> 645

<212> PRT

<213> Neurospora crassa

<400> 3

Sequencing list

Met Ser Trp Arg Lys Asp Gln Asp Glu Arg Leu Asp Gly Asp Glu Gly
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Asp Glu Glu Leu Asp Glu Asn Val Ser Tyr His Gln Ser Thr His Val
20 25 30

Leu Phe Ala Ile Asp Val Ser Lys Ser Met Leu Lys Pro Pro Gln Asn
35 40 45

Thr Gly Asp Lys Lys Ala Asp Lys Asp Ser Ala Leu Thr Ala Ala Leu
50 55 60

Thr Cys Ala Tyr Gln Ile Met Gln Gln Arg Ile Ile Ser Gln Pro Lys
65 70 75 80

Asp Met Met Gly Val Leu Leu Phe Gly Thr Glu Lys Ser Lys Phe Arg
85 90 95

Asp Asp Ser Gly Asn Gly Thr Gly Tyr Pro His Cys Tyr Leu Leu Ser
100 105 110

Asp Leu Asp Ile Pro Gly Ala Glu Asp Val Lys Lys Leu Lys Ala Leu
115 120 125

Ile Glu Asp Gly Asp Asp Glu Asp Glu Ile Met Val Pro Ser Lys Glu
130 135 140

Pro Val Ile Met Ser Asn Met Leu Phe Cys Ala Asn Gln Val Phe Thr
145 150 155 160

Thr Asn Ala Ala Asn Phe Gly Ser Arg Arg Leu Phe Ile Val Thr Asp
165 170 175

Asn Asp Asp Pro His Ala Gly Asp Lys Gln Ala Lys Ser Ser Ala Ala
180 185 190

Val Arg Ala Lys Asp Leu Tyr Asp Leu Gly Val Val Ile Glu Leu Phe
195 200 205

Pro Ile Ser Arg Glu Asp Lys Lys Phe Asp Leu Ser Lys Phe Tyr Asp
210 215 220

Asp Ile Ile Tyr Arg Asn Pro Ala Ala Glu Ala Gly Gln Ser Glu Ser
225 230 235 240

Pro Lys Thr Ser Lys Ser Gly Asp Gly Leu Thr Leu Leu Asn Ser Leu

245

Sequencing list
250

255

Ile Ser Asn Ile Asn Ser Lys Gln Thr Pro Lys Arg Ser Tyr Phe Ser
 260 265 270

Asn Leu Pro Phe Glu Leu Ala Pro Gly Leu Thr Ile Ser Ile Lys Gly
 275 280 285

Tyr Met Pro Leu Asn Arg Gln Thr Pro Thr Arg Ser Cys Tyr Val Tyr
 290 295 300

Glu Gly Glu Glu Gln Ala Gln Val Val Gln Ser Glu Thr Ala Gln Val
 305 310 315 320

Asp Phe Ala Ala Arg Thr Val Glu Lys Ser Glu Leu Arg Lys Gly Tyr
 325 330 335

Lys Phe Gly Gly Glu His Ile Cys Phe Lys Pro Glu Glu Leu Ala Glu
 340 345 350

Leu Lys Gln Met Gly Lys Lys Thr Leu Arg Ile Ile Gly Phe Lys Lys
 355 360 365

Arg Ser Lys Ile Pro Ser Trp Ala Ser Val Lys Lys Ser Ile Phe Ile
 370 375 380

Phe Pro Ser Glu Glu Gln Tyr Val Gly Ser Thr Arg Val Phe Ser Ala
 385 390 395 400

Leu Trp Gln Lys Leu Leu Lys Asp Asp Lys Val Gly Ile Ala Trp Phe
 405 410 415

Val Ala Arg Glu Asn Ala His Pro Val Met Val Ala Ile Phe Pro Ser
 420 425 430

Gly Asn Pro Asp Asp Glu Glu Ala Asn Thr Pro Tyr Leu Pro Ala Gly
 435 440 445

Leu Trp Leu Tyr Pro Leu Pro Phe Ala Asp Asp Val Arg Ser Val Asp
 450 455 460

His Val Thr Ala Pro Pro Arg Pro Ala Asp Glu Leu Thr Asp Gln Met
 465 470 475 480

Arg Gln Val Ile Gln Asn Leu Gln Leu Pro Lys Ala Met Tyr Asp Pro
 485 490 495

Sequencing list

Arg Lys Tyr Pro Asn Pro Ser Leu Gln Trp His Tyr Lys Ile Leu Gln
500 505 510

Ala Lys Ala Leu Asp Glu Glu Thr Pro Asp Ala Met Asp Asp Val Thr
515 520 525

Leu Pro Lys Tyr Arg Gln Ile Asp Lys Arg Val Gly Gly Tyr Leu Ala
530 535 540

Glu Trp Lys Glu Met Leu Ala Lys Lys Ala Asn Asp Leu Gln Asn Thr
545 550 555 560

Arg Ala Phe Lys Arg Glu Phe Glu Glu Asp Asp Glu Arg Pro Ala Lys
565 570 575

Arg Ala Lys Pro Ser Lys Lys Ala Ala Ser Gly Gly Gly Pro Ala
580 585 590

Asn Ser Asn Ala Asp Leu Lys Lys Ala Phe Glu Gln Gly Thr Leu Gly
595 600 605

Lys Met Thr Val Ala Glu Leu Lys Asp Ile Met Ala Ser Lys Gly Ile
610 615 620

Ser Thr Ala Gly Arg Lys Ala Glu Leu Val Glu Arg Leu Glu Gln Trp
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Val Glu Glu Asn Leu
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<210> 4

<211> 661

<212> PRT

<213> Neurospora crassa

<400> 4

Met Ala Asp Lys Glu Ala Thr Val Tyr Val Ile Asp Leu Gly Glu Ser
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Met Ala Asp Cys His Asn Gly Arg Asn Glu Ser Asp Leu Glu Phe Gly
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Met Arg Tyr Ile Trp Asp Lys Ile Thr Thr Thr Val Ala Ala Ser Arg
35 40 45

Lys Thr Trp Asn Val Gly Val Val Gly Leu Asn Thr Asp Glu Thr Asn
50 55 60

Sequencing list

Asn Asn Glu Asn Arg Glu Glu Tyr Gln Gly Tyr Glu Asn Ile Ser Val
65 70 75 80

Leu Gln Glu Leu Gly Pro Met Thr Met Ala Ser Leu Arg Ala Leu Lys
85 90 95

Ser Lys Ile Glu Pro Ser Ser Thr Ser Ser Ala Asp Ala Ile Ser Ala
100 105 110

Ile Val Val Ala Leu Arg Met Ile Gln Thr Phe Thr Lys Lys Leu Lys
115 120 125

Tyr Lys Arg Lys Ile Ile Val Val Thr Asn Gly Glu Ser Pro Ile Asp
130 135 140

Asp Asp Gln Ser Glu Glu Val Ala Asn Met Leu Asn Asp Val Gly Ile
145 150 155 160

Glu Leu Ile Val Leu Gly Val Asp Phe Asp Asp Ala Glu Tyr Gly Phe
165 170 175

Lys Glu Glu Asp Lys Pro Arg His Lys Glu Gln Asn Glu Lys Ile Leu
180 185 190

Lys Thr Leu Val Asp His Cys Glu Ser Gly Ala Phe Gly Thr Met Ala
195 200 205

Gln Ala Val Glu Glu Leu Ala Thr Pro Arg Ile Lys Ser Val Arg Pro
210 215 220

Phe Lys Ala Tyr Asp Gly Pro Leu Thr Leu Gly Asp Pro Gln Lys Tyr
225 230 235 240

Pro Ser Ala Leu Ser Ile Gln Val Glu Arg Tyr Phe Lys Thr Lys Arg
245 250 255

Ala Thr Pro Pro Ser Ala Ser Asn Val Ala Asn Pro Asn Gly Pro Pro
260 265 270

Gln Thr Gln Val Trp Asn Glu Asp Asp Gly Val Pro Phe Ser Gly Val
275 280 285

Gly Leu Gln Pro Val Lys Gln Leu Arg Thr Tyr Arg Ile Glu Asp Ser
290 295 300

Sequencing list

Lys Ala Ala Gly Gly Lys Lys Asp Val Asp Met Glu Asp Leu Ala Lys
305 310 315 320

Ala Tyr Gln Tyr Gly Arg Thr Val Val Pro Phe Gly Lys Ser Glu Glu
325 330 335

Asp Tyr Leu Lys Tyr Glu Thr Thr Lys Ser Phe Thr Ile Ile Gly Phe
340 345 350

Val Pro Met Ser Ser Tyr Glu Pro Phe Leu Asn Met Gly Glu Thr Gly
355 360 365

Leu Ile Val Ala Gln Lys Val Asn Glu Glu Ala Glu Leu Gly Leu Ser
370 375 380

Ala Leu Ile His Ala Leu His Glu Leu Glu Ser Tyr Ala Val Ala Arg
385 390 395 400

Tyr Val Asn Lys Asp Lys Ala Pro Pro Gln Ile Leu Leu Leu Lys Pro
405 410 415

Asn Pro Ala Ile Glu Asp Asp Ile Glu Cys Leu Tyr Asp Ile Pro Leu
420 425 430

Pro Phe Ala Glu Asp Val Arg Ser Tyr Gln Phe Pro Pro Leu Asp Lys
435 440 445

Val Leu Thr Ile Thr Gly Asn Val Leu Thr Glu His Arg Leu Leu Pro
450 455 460

Asn Asn Asp Leu Gln Gln Ala Met Ser Asp Tyr Val Asp Ala Met Asp
465 470 475 480

Leu Thr Glu Tyr Gly Gln Asp Asp Asp Gly His Pro Ala Glu Tyr Ala
485 490 495

Pro Ile Asp Asp Leu Tyr Asn Pro Val Ile His His Met Asn Gln Ala
500 505 510

Ile Arg Asn Arg Ala Val Asn Pro Asp Ala Pro Leu Pro Pro Val Ala
515 520 525

Glu Ile Leu Thr Arg Phe Thr His Pro Pro Glu Pro Leu Leu Ala Lys
530 535 540

Ala Lys Thr Glu Ile Asp Gly Leu Ile Gln Ala Ala Glu Val Lys Lys
545 550 555 560

Sequencing list

Ala Glu Asp Asp Glu Thr Ile Glu Ile Ala Ala Lys Gln Met Gly Asn
565 570 575

Ile Ile Cys Lys Leu Val Ser Asp Ser Phe Ala Asp Val Leu Tyr Pro
580 585 590

Arg Ala Ala Glu Asn Leu Arg Val Met Arg Glu Glu Leu Ile Asn Met
595 600 605

Glu Val Pro Thr Leu Tyr Asn Lys Tyr Ile Thr Lys Leu Lys Glu Ser
610 615 620

Leu Leu Ser Val Ser Glu Ser Lys Ser Met Gly Gly Ser Leu Thr Gly
625 630 635 640

Ser Gly Glu Asp Thr Asp Glu Glu Arg Gln Arg Lys His Pro Phe Ser
645 650 655

Ala Gln Glu Val Gly
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<210> 5
<211> 25
<212> DNA
<213> Artificial

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<223> Designed nucleotides

<400> 5
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25

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<211> 34
<212> DNA
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ggcgtaatag cgaaggata gttgctggaa ataa

34

<210> 7
<211> 33
<212> DNA
<213> Artificial

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Sequencing list

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<211> 25		
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ttggacgccc cacacctctc gctct		25
<210> 9		
<211> 34		
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<400> 9		
ttatttccag caactatctc ttgcgttatta cgcc		34
<210> 10		
<211> 34		
<212> DNA		
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<400> 10		
cacggtcatc aacaaggctt tacactttt gctt		34
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gccccgggag gttgttcgtt agctg		25
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<211> 34		
<212> DNA		
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Sequencing list

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34

<210> 14
<211> 25
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<400> 14
aaggcggagt tggcgtgc gaagg

25

<210> 15
<211> 34
<212> DNA
<213> Artificial

<220>
<223> Designed nucleotides

<400> 15
cagcaaagcc gaaaaggctc ttgcgttattt cgcc

34

<210> 16
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<212> DNA
<213> Artificial

<220>
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<400> 16
acctgtctcc aaccctgctt tacactttat gctt

34

<210> 17
<211> 25
<212> DNA
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<220>
<223> Designed nucleotides

<400> 17
gagaactgat catcgatgc gtggc

25

Sequencing list

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25

<210> 19
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<210> 20
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<210> 21
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cacattgtcc aagcttactg tggctaccc

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<212> DNA
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<210> 23
<211> 41

Sequencing list

<212> DNA
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<210> 24
<211> 41
<212> DNA
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<400> 24
agaacagcgg ccgcaagaga tctcgatcac tgcttatgtat c

41

<210> 25
<211> 40
<212> DNA
<213> Artificial

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<223> Designed nucleotides

<400> 25
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40

<210> 26
<211> 37
<212> DNA
<213> Artificial

<220>
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<400> 26
catgtcgaca tttcaagaca ggtgaagagg tgacaag

37

<210> 27
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Designed nucleotides

<400> 27
gctatagtcg actctgcatt taaggagaga atagctgtg

39

<210> 28
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<212> DNA
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Sequencing list

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	ctttaggcgg ccgcaattca agatgagtca taagaggatc	40
<210>	30	
<211>	40	
<212>	DNA	
<213>	Artificial	
<220>		
<223>	Designed nucleotides	
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